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## NATIONAL INTELLIGENCE SURVEY

## THAILAND

METEOROLOGICAL ORGANIZATION  
AND FACILITIES

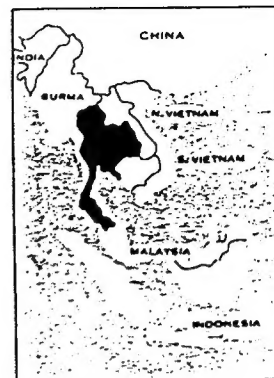
## A. GENERAL

## 1. History

Meteorology in Thailand began during the early part of the 20th century when the subject became part of the navigation course in the Royal Thai Naval Academy at the insistence of the Naval Commander in Chief, Admiral Prince Chumporn Khetr Undomsakdhi, who is generally recognized as the architect of the modern Royal Thai Navy (RTN). The admiral recognized the value of weather information in marine navigation and the need for young officers to understand its application. He taught the original course, and one of his early students, later to become Vice Admiral Phya Rajwangson, eventually wrote the first book on meteorology to be published in the Thai language. The book was subsequently used as the standard text in the naval academy.

In 1923 the Thai Navy submitted a plan to the Ministry of Land and Agriculture calling for the establishment of a national meteorological service. This plan was adopted, and a meteorological section was formed under the Department of Irrigation. A Swiss engineer and meteorologist, Mr. H. Brandi, headed the section which, at that time, consisted of a network of eight observing stations.

In 1933 two young naval officers, Lt. Charoon V. Bunnag and Lt. Charas Bonbonkar, were sent to India and to the Philippines to study meteorology. After 3 years of study, these officers returned to revise, expand, and modernize the meteorological techniques and procedures in the meteorological section of the Department of Irrigation. Their efforts eventually led to the establishment of a modern meteorological organization and to the transfer in 1936 of the meteorological section from the Department of Irrigation to the Royal Thai Navy. The new organization was called the Meteorology Division of the Hydrographic Department



of the Navy and was placed under the direction of Lt. Bunnag, who headed the division for the next 30 years.

During the period from 1936 to 1944 the Meteorology Division grew—its responsibilities broadened to include service to civil and military aviation, transportation, industry, agriculture, and commercial enterprises and to effect coordination with the meteorological services of other nations. In April 1944 the Royal Thai Government raised the status of the service to that of a department of the Royal Thai Navy with, by then, Vice Admiral Bunnag as chief. International stature and recognition came to the Thai meteorological service when Admiral Bunnag assisted in the establishment of the World Meteorological Organization (WMO) in September 1947. He also became one of the first permanent representatives to that body.

The Meteorology Department continued to flourish and expand; its growth, relatively speaking, outpaced that of its parent service. Accordingly, at the time of Admiral Bunnag's retirement in 1962, the department was removed from the control of the Thai Navy and set up as a separate department directly under the Office of the Prime Minister.

## 2. Organization

The Civil Meteorological Department (CMD) is the official name of the Thai meteorological organization. It is directly responsible to the Office of the Prime Minister and is organized into eight divisions and branches. The chief of the CMD, Vice Admiral Sanit Vesa-Rajananda, has held the

position since the reorganization in 1962. FIGURE 1 depicts the present organization as well as the names of the directors or chiefs of the various divisions and branches. It will be noted that most of the leading officials and personnel of the present department are from the Thai Navy. A brief résumé of the responsibilities of the eight divisions and branches follows:

The Office of the Secretary is responsible for all administrative functions, which include issuing rules and regulations, preparation of budgets, conducting public relations, coordination with other agencies, and representing Thailand on meteorological matters with foreign or international weather organizations.

The Observations Branch establishes and maintains the network of meteorological stations, trains personnel in observation techniques and coding methods, and handles the assignment of all observing personnel.

The Climatology Division assembles and prepares climatological summaries and statistics, processes and analyzes the data, and publishes weekly, monthly, and annual bulletins and summaries of climatological records, meteorological statistics, and scientific notes.

The Upper-air and Maritime Meteorology Division operates the upper-air stations in the country. It also collects and analyzes all upper-air and maritime data, publishes bulletins derived from such analyses, and conducts limited research on the upper atmosphere.

The Meteorological Instruments Division is responsible for the acquisition of all meteorological instruments, their calibration, distribution, and maintenance.

The Agricultural Meteorology Division deals with all aspects of weather affecting crop production and animal and human environment. It issues weekly bulletins giving the latest information on crop production. These bulletins are disseminated by the press and by radio.

The Hydrological Division maintains a network of rainfall and river-stage stations necessary to forecast and issue warnings of floods.

The Forecasting Branch is charged with all weather forecasting with the exception of that for the Thai Air Force. It is responsible for the processing and analysis of meteorological data, preparation of charts and weather forecasts, the issuance of storm warnings, and support to national and international civil aviation and other civilian interests. This branch is also responsible for all weather communications, both national and international.

Military weather support is provided by the Royal Thai Air Force (RTAF) Weather Service. The RTAF Weather Service, with headquarters at Don Muang Air Base, maintains detachments at several RTAF bases. These detachments are under the command of the local base commander. The

service is relatively small, with few adequately trained personnel, and in many instances duplicates the service provided by the Civil Meteorological Department. The RTAF Weather Service director in 1965 was Colonel Banpan Zupraviti.

## B. OBSERVING AND FORECASTING FACILITIES AND EQUIPMENT

### 1. Observing facilities

There are over 50 surface weather observing stations in Thailand, most of them are operated by the Civil Meteorological Department (CMD) and approximately 10 are operated by the USAF, the RTAF, the RTN or various combinations of these organizations (FIGURE 3). The observing stations are scattered throughout the country and provide adequate data coverage for synoptic purposes. Most of these stations are located at airfields, but only 14 of them make synoptic weather observations for all 24 hours of the day. Many of the others operate from 0700 to 2000 hours local time, taking hourly aviation and 3-hourly synoptic observations while in operation.

Five stations in Thailand measure upper-air parameters with rawinsonde equipment. Three of these, Chiangmai, Songkhla, and Bangkok, all operated by the CMD, make two observations a day at 0000Z\* and 1200Z. The stations at Ubon Ratchathani and Udon Thani, operated jointly by the USAF and CMD, make four observations a day at 0000, 0600, 1200, and 1800Z. In addition, eight stations in Thailand make winds aloft measurements, some by radar tracking and others by the pilot balloon (pibal) method. FIGURE 2 is a list of Thai synoptic weather stations, showing their schedule and type of observations.

The Thai state that they have over 500 rainfall measuring posts; data for over 300 of them are known to be published weekly. Other observations performed by the CMD are those involving solar radiation, sunshine duration, evaporation, seismological information, soil temperatures, and state of the sea.

\* Z denotes Greenwich mean time.

## 2. Forecasting facilities

The CMD maintains a major forecast and analysis center at Don Muang Airport, near Bangkok. The RTAF also operates an adjoining but separate center at the same location. The CMD center functions as a Main Meteorological Office (MMO) and provides weather forecasts for all purposes except those in support of military aviation. The office operates 24 hours a day, is responsible for the collection and dissemination of all weather information, and is a storm-warning center; it maintains a meteorological watch for the principal air routes and forecasts terminal weather conditions for the major international airports of the Far East. Surface, upper-air, and winds aloft charts for all synoptic map times are plotted and analyzed at this office.

Forecast centers are also maintained at the Dependent Meteorological Offices (DMO) located at Chiangmai and Songkhla and at the Supplementary Meteorological Office (SMO) at Udon Thani. These meteorological offices, supervised by the MMO, supply meteorological information and provide briefings for flights within the country and for flights up to 500 miles out of the country. A limited number of surface and upper-air charts are plotted and analyzed at these centers, and forecasts for the local area are prepared. These centers also relay weather information for international flights.

The Royal Thai Navy operates a forecast center at the station at Sattahip for naval and marine activities.

The MMO in Bangkok publishes daily weather maps and forecasts for use by the general public, as well as supplying forecasts for agricultural and shipping interests and government agencies. Also published by this center are weekly charts reviewing the past week's weather and giving a general outlook for the coming week.

## 3. Equipment

Most of the weather equipment in use in Thailand is of U.S. manufacture, but some of it comes from England, Germany, and Japan. As far as is known, the Thai have no capability for the manufacture of their own weather instruments or equipment. All makes of equipment are kept in satisfactory operating condition by a fairly efficient maintenance program.

Rawin and radiosonde equipment are usually maintained and their operation supervised by USAF personnel. Weather radar storm detection units are operated by the USAF at six military stations in Thailand. The CMD also operates storm detection units at four civil stations.

## C. CLIMATOLOGICAL SERVICES

The Climatology Division of the CMD is an efficient, productive office which publishes many accurate and informative climatological studies. It has limited automatic data processing capability, and an undetermined amount of data are known to be on IBM punch cards. The following are some of the publications and types of data issued on a monthly or periodic basis with a brief résumé of their contents:

- 1) *Monthly Summary of Climatological Data*—monthly climatological summaries for approximately 50 surface stations.
- 2) *Monthly Meteorological Bulletin*—a review of the past month's weather includes monthly climatological summaries for about 10 coastal stations, monthly precipitation summaries for about 80 stations, and wind roses for 2 stations. Also, hourly values of various climatic elements and monthly summaries for the station at Bangkok.
- 3) *Monthly Radiosonde Observation Data*—unabridged radiosonde observations, monthly summaries and diagrams of pressure height, temperature, and relative humidity for Bangkok at standard upper-air surfaces up to 150 millibars.
- 4) *Winds Aloft Data*—unabridged winds aloft observations for Bangkok during the month and summaries from 5 other stations for various levels to 40,000 feet. Monthly frequency tables, of simultaneous occurrence, within specified ranges, of various climatic elements of interest to aviation for four airfields.
- 5) Monthly and annual precipitation summaries for about 400 stations; monthly and annual data on river stages for about 30 stations, reviews of precipitation, tropical storm, and river stage conditions; charts showing distribution of precipitation and storm tracks.
- 6) Monthly and annual rainfall of Thailand with departures from normal for the period from 1911 to 1960.
- 7) Various other climatic publications.

## D. WEATHER COMMUNICATIONS

The Civil Meteorological Department has its main communications center in downtown Bangkok. It is a fairly well equipped center under-

going periodic improvement including a modernization program recently completed by a telecommunications expert from the Federal Republic of Germany working under WMO sponsorship. Included among the facilities at the center are radioteletype, landline teletype, single-sideband radio, high-frequency radio, and radiotelephone. Radioteletype, landline teletype, and single-sideband radio are used to exchange data within Thailand; radioteletype and high-frequency radio are used to enter these data in international circuits and to receive data from other countries; high-frequency radio is used to communicate with ships at sea, and radiotelephone is reserved for special purposes.

Communications for the meteorological services located at and/or servicing air force and army units are operated by the Ministry of Communications. The communication facilities at the naval bases at Sattahip and Pom Phra Chulachomklao are operated by the Royal Thai Navy. Military communication facilities are practically the same as those of the CMD.

Schedules of transmissions, call signs, frequencies, contents of weather broadcasts, and modes of transmission may be found in the World Meteorological Organization publication *Weather Reporting, Volume C: Transmissions*, WMO - No. 9. TP. 4; in the U.S. Naval Oceanographic Office publication *Radio Weather Aids*, H.O. Pub. 118; in International Civil Aviation Organization (ICAO) documents; and in appropriate USAF Air Weather Service publications.

#### E. TRAINING AND PROFICIENCY OF PERSONNEL

The CMD has an inservice training program for all of its technical personnel. The Thai language is used in all such training programs; however, most graduate forecasters and many of the observer personnel are reasonably proficient in English. Since 1963 a prerequisite for enrollment in forecasting school has been a BS degree in either physics or mathematics. Formal training is conducted at an ICAO sponsored school in Bangkok or under the auspices of the ICAO in a foreign country, usually the U.S. The ICAO forecasters' school lasts for 12 months. After graduation all forecasters receive

on-the-job training before being assigned to duty. The more promising forecasters are eligible to pursue graduate study abroad. To date, approximately 20 forecasters in the CMD have either been trained or have completed their graduate work in the U.S. All observer personnel are trained in Thailand. The formal course is 12 months long and consists of 6 months training in meteorological theory and climatology and 6 months in station operations. A high school or junior college diploma is an eligibility requirement for observers.

RTAF forecasters receive formalized on-the-job training at the Don Muang RTAF weather facilities; all must have a university degree with a science major before entering this training. Because of an increasing demand for trained personnel in the forecasting field, the RTAF is organizing a school to train noncommissioned officers as forecast assistants. RTAF student weather observers undergo a 2-year course of training which includes classes in weather observing methods and techniques, as well as courses in general science, mathematics, and English.

The U.S. Air Force under the Military Assistance Program has conducted a number of classes for RTAF weather personnel. The classes, ranging in length from 4 to 104 weeks, include such subjects as tropical meteorology, tropical analyses and forecasting, weather equipment repair, and training as weather staff officers, weather observers, and weather forecast technicians. Plans call for this military training to continue on a much smaller scale in the future.

The CMD is a well-organized and relatively efficient weather service. The naval training and development programs instituted over the years have produced a corps of well-trained, highly qualified, and devoted personnel. The RTAF Weather Service, on the other hand, is a fairly new service and has many problems and some major difficulties to overcome. Reports have indicated that jealousy and rivalry exist between it and the more efficient CMD, that much of the RTAF effort duplicates that of the CMD, and that it might be more efficient under civilian control. However, the personnel who have trained under the Military Assistance Pro-

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gram and those who have been closely associated with U.S. personnel at jointly operated weather activities are well qualified and highly motivated and should form, if they remain in service, a strong nucleus for an efficient RTAF weather organization. A recent report from a qualified U.S. observer states that the RTAF Weather Service could probably operate a service sufficient to support RTAF aircraft if U.S. weathermen withdraw. However, they do not have the capability to operate and main-

tain the more sophisticated USAF equipment installed at RTAF bases supporting USAF operations.

#### F. SOURCES

Information contained in this supplement was derived from intelligence reports and from publications issued by the World Meteorological Organization and by the U.S. Naval Oceanographic Office. These sources represent the best information available.

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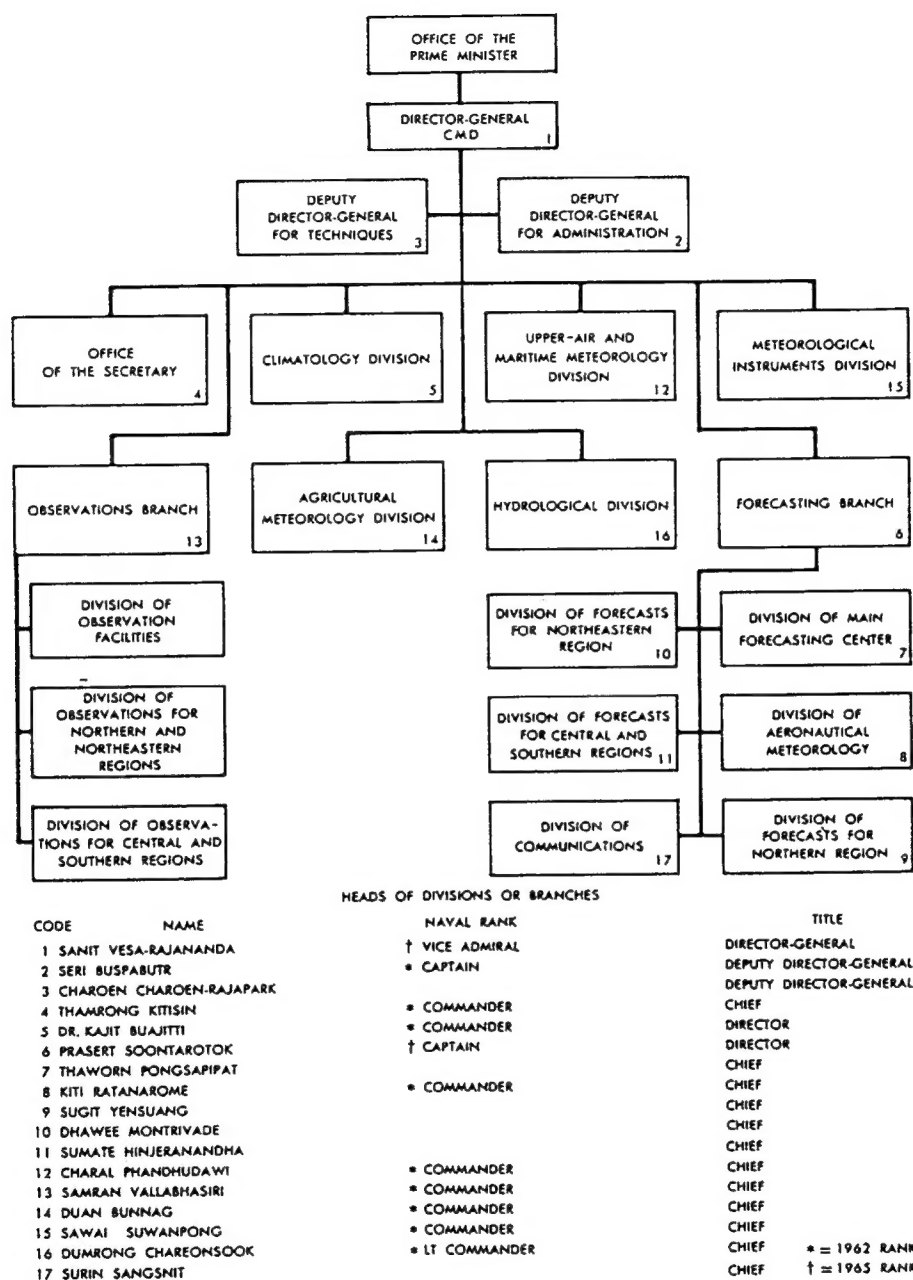


FIGURE 1. Organization of the Civil Meteorological Department



FIGURE 2. Synoptic meteorological stations in Thailand

| STATION                  | INDEX<br>NUMBER | LATI-<br>TUD E | LONGI-<br>TUD E | ELE-<br>VATION | OBSERVATIONS (z*) |    |    |    |    |    |    |    |           |    |    |    |  |  | REMARKS |
|--------------------------|-----------------|----------------|-----------------|----------------|-------------------|----|----|----|----|----|----|----|-----------|----|----|----|--|--|---------|
|                          |                 |                |                 |                | Surface           |    |    |    |    |    |    |    | Upper-air |    |    |    |  |  |         |
|                          |                 |                |                 |                | 00                | 03 | 06 | 09 | 12 | 15 | 18 | 21 | 00        | 06 | 12 | 18 |  |  |         |
| Aranyaprathet.....       | **48462         | 13 42          | 102 35          | 144            | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | CLIMAT, EVAP                                       |  |         |
| Ban Don.....             | 48551           | 9 08           | 99 18           | 10             | x                 | x  | x  | x  | x  | x  | x  | x  | x         | P  | .. | P  | EVAP, SOILTEMP, SUNDUR                             |  |         |
| Bangkok.....             | ***48455        | 13 44          | 100 30          | 39             | x                 | x  | x  | x  | x  | x  | x  | x  | x         | RW | P  | RW | CLIMAT, EVAP, RSD, SOLRA,<br>SOILTEMP, SUNDUR      |  |         |
| Bhumibol Dam.....        | **48377         | 17 14          | 99 03           | 538            | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | EVAP   |  |         |
| Chaiyaphum.....          | 48403           | 15 45          | 102 02          | ..             | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | Do.  |  |         |
| Chanthaburi.....         | 48480           | 12 37          | 102 07          | 16             | x                 | x  | x  | x  | x  | x  | x  | x  | x         | P  | .. | P  | CLIMAT, EVAP, SUNDUR,<br>SOILTEMP                  |  |         |
| Chiang Rai.....          | 48303           | 19 55          | 99 50           | 1,365          | x                 | x  | x  | x  | x  | x  | x  | x  | x         | .. | .. | .. | EVAP, SUNDUR                                       |  |         |
| Chiangmai.....           | ***48327        | 18 47          | 98 59           | 1,027          | x                 | x  | x  | x  | x  | x  | x  | x  | x         | RW | P  | RW | CLIMAT, EVAP, SISMO,<br>SOILTEMP, SOLRA,<br>SUNDUR |  |         |
| Chon Buri.....           | 48459           | 13 22          | 100 59          | 20             | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | C, EVAP, SEA                                       |  |         |
| Chumphon.....            | 48517           | 10 27          | 99 15           | 10             | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | CLIMAT, EVAP, SOILTEMP                             |  |         |
| Don Muang.....           | ***48456        | 13 55          | 100 36          | 39             | x                 | x  | x  | x  | x  | x  | x  | x  | x         | .. | .. | .. | C, EVAP, SEA, SUNDUR                               |  |         |
| Hua Hin.....             | 48475           | 12 34          | 99 48           | 10             | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | EVAP   |  |         |
| Kanchanaburi.....        | 48450           | 14 01          | 99 32           | 92             | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | C, EVAP, SEA                                       |  |         |
| Khlong Yai.....          | **48501         | 11 47          | 102 53          | 13             | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | EVAP, SOILTEMP, SUNDUR                             |  |         |
| Khon Kaen.....           | 48381           | 16 20          | 102 51          | 515            | x                 | x  | x  | x  | x  | x  | x  | x  | x         | .. | .. | .. | EVAP   |  |         |
| Khun Yuam.....           | **48302         | 18 52          | 97 54           | ..             | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | C, EVAP, SEA                                       |  |         |
| Ko Si Chang.....         | 48460           | 13 09          | 100 49          | 85             | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | EVAP   |  |         |
| Lampang.....             | 48328           | 18 15          | 99 30           | 797            | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | EVAP, SOILTEMP, SUNDUR                             |  |         |
| Loei.....                | 48353           | 17 32          | 101 30          | ..             | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | EVAP, SOILTEMP                                     |  |         |
| Lop Buri.....            | 48426           | 14 48          | 100 37          | 43             | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | Do.  |  |         |
| Mae Hong Son.....        | 48300           | 19 18          | 97 50           | 889            | x                 | x  | x  | x  | x  | x  | x  | x  | x         | .. | .. | .. | Do.  |  |         |
| Mae Sariang.....         | 48325           | 18 10          | 97 50           | 1,030          | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | Do.  |  |         |
| Mae Sot.....             | 48375           | 16 40          | 98 33           | 689            | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | EVAP, SOILTEMP, SOLRA,<br>SUNDUR                   |  |         |
| Mukdahan.....            | 48383           | 16 33          | 104 44          | 453            | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | P  | P  | P  | CLIMAT, EVAP, SUNDUR,<br>SOILTEMP                  |  |         |
| Nakhon Phanom.....       | ***48357        | 17 30          | 104 20          | 459            | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | CLIMAT, EVAP, SOILTEMP                             |  |         |
| Nakhon Ratchasima.....   | 48431           | 14 58          | 102 07          | 594            | x                 | x  | x  | x  | x  | x  | x  | x  | x         | P  | P  | P  | EVAP   |  |         |
| Nakhon Sawan.....        | 48400           | 15 48          | 100 10          | 92             | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | C, EVAP, SEA                                       |  |         |
| Nakhon Si Thammarat..... | 48552           | 8 25           | 99 58           | 16             | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | EVAP   |  |         |
| Nan.....                 | 48331           | 18 47          | 100 47          | 660            | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | C, EVAP, SEA                                       |  |         |
| Narathiwat.....          | 48583           | 6 26           | 101 50          | 13             | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | EVAP   |  |         |
| Pai.....                 | **48301         | 19 20          | 98 27           | 1,772          | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | .. | .. | .. | EVAP, SOILTEMP                                     |  |         |
| Phetchabun.....          | 48379           | 16 25          | 101 08          | 374            | x                 | x  | x  | x  | x  | x  | .. | .. | ..        | P  | .. | .. |  |  |         |

Footnotes are at end of table.

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FIGURE 2. Synoptic meteorological stations in Thailand (Continued)

| STATION                     | INDEX<br>NUMBER | LATI-<br>TUD E | LONGI-<br>TUD E | ELE-<br>VATION | OBSERVATIONS (z*) |    |    |    |    |    |    |    |           |    |    |    | REMARKS   |
|-----------------------------|-----------------|----------------|-----------------|----------------|-------------------|----|----|----|----|----|----|----|-----------|----|----|----|---|
|                             |                 |                |                 |                | Surface           |    |    |    |    |    |    |    | Upper-air |    |    |    |   |
|                             |                 |                |                 |                | 00                | 03 | 06 | 09 | 12 | 15 | 18 | 21 | 00        | 06 | 12 | 18 |   |
| Phitsanulok.....            | ***48378        | o 'N.<br>16 50 | o 'E.<br>100 16 | Feet<br>164    | x                 | x  | x  | x  | x  | x  | x  | x  | x         | P  | P  | P  | CLIMAT, EVAP, SUNDUR,<br>SOILTEMP                   |
| Phrae.....                  | 48330           | 18 10          | 100 08          | 515            | x                 | x  | x  | x  | x  | x  | x  | x  | x         | x  | x  | x  | Do.   |
| Phuket.....                 | 48564           | 7 58           | 98 24           | 10             | x                 | x  | x  | x  | x  | x  | x  | x  | x         | x  | x  | x  | C, SEA, SUNDUR                                      |
| Phuket Airport.....         | 48565           | 8 08           | 98 19           | ..             | x                 | x  | x  | x  | x  | x  | x  | x  | x         | P  | x  | x  | C, EVAP, SEA  |
| Pom Phra Chulachom-<br>kha. | **48457         | 13 32          | 100 35          | 10             | x                 | x  | x  | x  | x  | x  | x  | x  | x         | x  | x  | x  | EVAP, SOILTEMP                                      |
| Prachin Buri.....           | 48430           | 14 10          | 101 10          | 23             | x                 | x  | x  | x  | x  | x  | x  | x  | x         | x  | x  | x  | C, CLIMAT, EVAP, SEA                                |
| Prachuap Khiri Khan..       | 48500           | 11 48          | 99 48           | 16             | x                 | x  | x  | x  | x  | x  | x  | x  | x         | P  | x  | x  | EVAP  |
| Ranong.....                 | 48532           | 9 58           | 98 38           | 26             | x                 | x  | x  | x  | x  | x  | x  | x  | x         | x  | x  | x  | EVAP, SUNDUR  |
| Roi Et.....                 | 48405           | 16 03          | 103 41          | 459            | x                 | x  | x  | x  | x  | x  | x  | x  | x         | x  | x  | x  | Do.   |
| Sakon Nakhon.....           | 48356           | 17 10          | 104 09          | 525            | x                 | x  | x  | x  | x  | x  | x  | x  | x         | x  | x  | x  | C, EVAP, SEA  |
| Sattahip (RTN).....         | **48477         | 12 39          | 100 53          | 180            | x                 | x  | x  | x  | x  | x  | x  | x  | x         | RW | P  | RW | C, CLIMAT, EVAP, SEA,<br>SOLRA, SUNDUR,<br>SOILTEMP |
| Songkhla.....               | ***48568        | 7 11           | 100 37          | 33             | x                 | x  | x  | x  | x  | x  | x  | x  | x         | x  | x  | x  | EVAP  |
| Suphan Buri.....            | 48425           | 14 30          | 100 10          | 23             | x                 | x  | x  | x  | x  | x  | x  | x  | x         | x  | x  | x  | EVAP, SOILTEMP, SUNDUR                              |
| Surin.....                  | 48432           | 14 53          | 103 29          | 476            | x                 | x  | x  | x  | x  | x  | x  | x  | x         | x  | x  | x  | EVAP  |
| Tak.....                    | 48376           | 16 51          | 99 07           | 377            | x                 | x  | x  | x  | x  | x  | x  | x  | x         | x  | x  | x  | Do.   |
| Trang.....                  | 48567           | 7 30           | 99 40           | 39             | x                 | x  | x  | x  | x  | x  | x  | x  | x         | x  | x  | x  | CLIMAT, EVAP, SUNDUR,<br>SOILTEMP                   |
| Ubon Ratchathani.....       | ***48407        | 15 15          | 104 53          | 417            | x                 | x  | x  | x  | x  | x  | x  | x  | x         | RW | RW | RW | Do.   |
| Udon Thani.....             | ***48354        | 17 26          | 102 46          | 584            | x                 | x  | x  | x  | x  | x  | x  | x  | x         | RW | RW | RW | EVAP  |
| Uttaradit.....              | 48351           | 17 37          | 100 08          | 207            | x                 | x  | x  | x  | x  | x  | x  | x  | x         | x  | x  | x  |   |

\* Z denotes Greenwich mean time.

\*\* Rarely included in weather broadcasts.

\*\*\* Hourly observations made.

Abbreviations:

P..... Winds aloft observation only.

C..... Coastal station.

RW..... Upper-air and upper-wind observations.

SEA..... State of sea reports.

RSID..... Radar storm detectors.

EVAP..... Evaporation measurements.

SOLRA..... Solar radiation measurements.

SISMO..... Seismological observations.

SUNDUR..... Sunshine duration totals.

CLIMAT..... Climatic summaries transmitted.

SOILTEMP..... Soil temperature measurements.

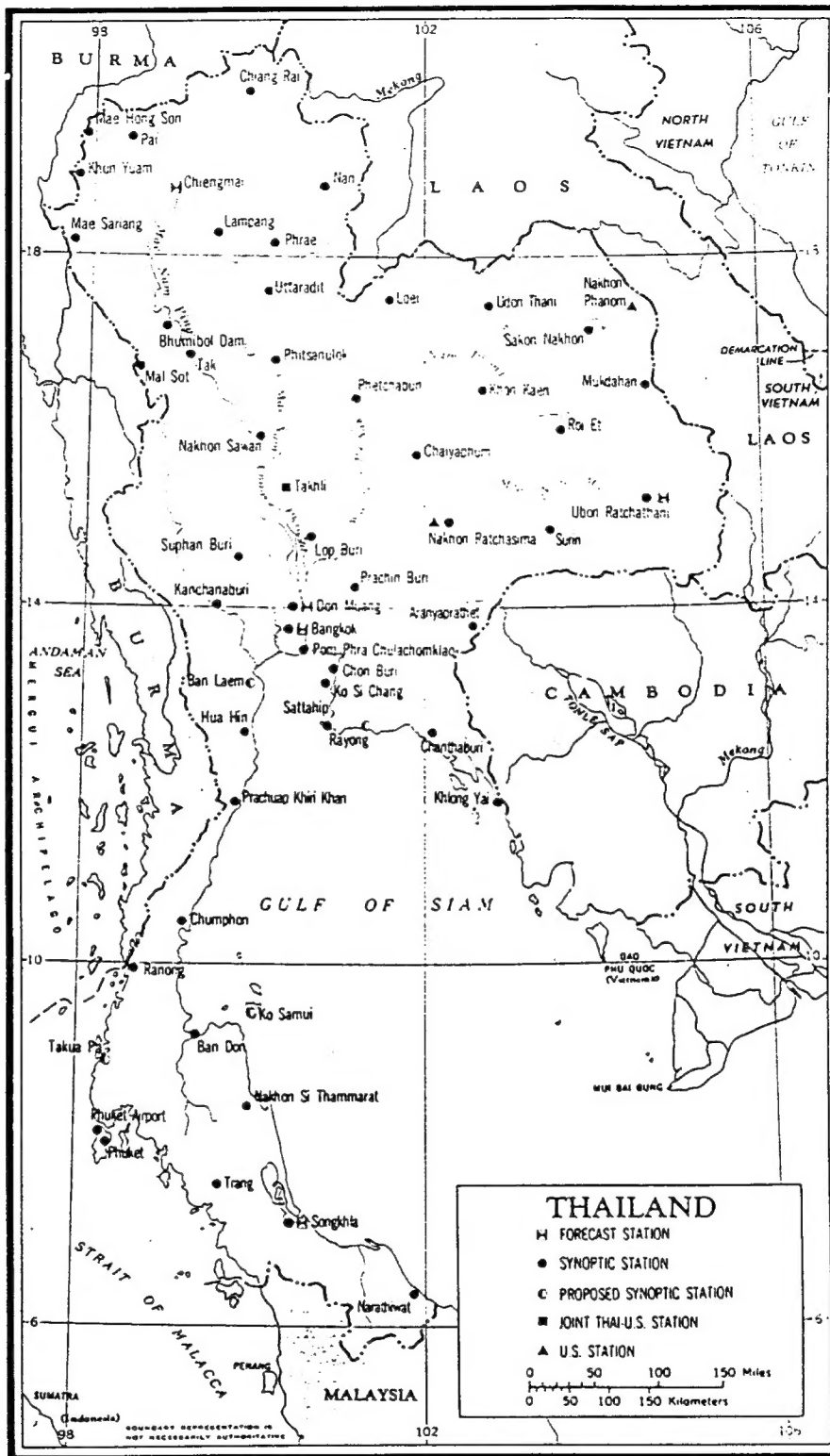


FIGURE 3. Weather stations of Thailand

*This section was prepared for the NIS by the  
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